What is claimed is:

1. A bone fiber having a textured surface, which acts as an effective binding substrate for bone-forming cells, wherein said binding induces or promotes new bone formation from bone-forming cells bound to said bone fiber.

2. The bone fiber of claim 1, wherein said bone fiber is demineralized.

3. The bone fiber of claim 1, wherein said bone fiber is not demineralized.

4. The bone fiber of claim 1, wherein said bone fiber is made from allogenic or xenogenic bone.

5. The bone fiber of claim 1, wherein bone fiber is made from cortical bone.

6. The bone fiber of claim 1, wherein said bone fiber has an average length of from about 1.0 mm to about 100 mm.

7. The bone fiber of claim 6, wherein said bone fiber has an average length of from about 20 mm to about 30 mm.

8. The bone fiber of claim 1, wherein said bone fiber has an average width of from about 0.5 mm to about 2.5 mm.

9. The bone fiber of claim 8, wherein said bone fiber has an average width of from about 1.0 mm to about 2.0 mm.

10. The bone fiber of claim 1, wherein said bone fiber has an average thickness of from about 0.2 mm to about 1.4 mm.

11. The bone fiber of claim 10, wherein said bone fiber has an average thickness is from about 0.4 mm to about 0.8 mm.

12. The bone fiber of claim 1, wherein said bone fiber is freeze-dried.

13. A bone material composition comprising a bone fiber of claim 2.

14. A bone material composition comprising a bone fiber and bone-forming cells, wherein said bone fiber has a textured surface which acts as an effective binding substrate for bone-forming cells and wherein said binding induces or promotes new bone formation from bone-forming cells bound to said bone fiber.

15. The bone material composition of claim 14, wherein the bone-forming cells are selected from stem cells, connective tissue progenitor cells, fibroblast cells, periosteal cells, chondrocytes, osteocytes, pre-osteoblasts, and osteoblasts.

16. The bone material composition of claim 15, wherein the bone-forming cells are stem cells.

17. The bone material composition of claim 14, wherein said bone fiber comprises allogenic or xenogenic bone.

18. The bone material composition of claim 14, wherein said composition further comprising cancellous bone.

19. The bone material composition of claim 14, wherein said composition further comprises cortical bone.

20. The bone material composition of claim 14, wherein said composition further comprises particulate calcium salts selected from the group consisting of calcium phosphate, calcium sulfate, and calcium carbonate.

21. The bone material composition of claim 14, wherein said composition comprises both demineralized and non-demineralized bone fibers.

22. The bone material composition of claim 14, wherein said composition is osteoinductive.

23. The bone material composition of claim 14, wherein said composition is freeze-dried.

24. The bone material composition of claim 14, further comprises an agent effective to initiate the induction of bone growth.

25. A method for inducing or promoting bone growth comprising providing a bone fiber having a textured surface effective to efficiently bind bone-forming cells, contacting said bone fiber to bone-forming cells, which adhere to the textured surface of said bone fiber, and allowing the bone-forming cells to adhere to the textured surface of the bone fiber thereby inducing or promoting new bone growth from the adhered bone-forming cells.

26. The method of claim 25, wherein said bone fiber is demineralized.

27. The method of claim 25, wherein said bone fiber is not demineralized.

28. The method of claim 25, wherein said method further comprises contacting the bone fibers and bone-forming cells with an agent effective to initiate the induction of the new bone growth.

29. The method of claim 25, wherein said agent is selected from the group consisting of at least one bone morphogenic protein, angiogenic factor, growth factor, differentiation factor, mitogenic factor, osteogenic factors, and chondrogenic factors.

30. The method of claim 25, wherein said bone-forming cells are selected from stem cells, connective tissue progenitor cells, fibroblast cells, periosteal cells, chondrocytes, osteocytes, pre-osteoblasts, and osteoblasts.

31. The method of claim 30, wherein the bone-forming cells are stem cells.

32. The method of claim 25, wherein said bone-forming cells are present in a biological fluid selected from the group consisting of plasma, bone marrow, blood, and blood products.

33. A cutter for producing substrate fibers comprising:

a leading edge and a trailing edge, said leading edge initially contacting the substrate during a cutting stroke, said trailing edge being raised a prescribed height above said leading edge;

a blade section disposed on a cutting surface of said cutter for cutting the substrate; and

at least one substrate fiber channel located proximate said blade section for directing substrate fibers away from the substrate.

34. The cutter of claim 33, wherein said blade section is elevated to a height defining a cutting thickness for said substrate fibers.

35. The cutter of claim 33, wherein said prescribed height is equal to the elevated height of said blade section.

36. The cutter of claim 33, wherein said blade section includes at least one row of teeth.

37. The cutter of claim 36, wherein each tooth includes at least one predetermined cutting angle.

38. The cutter of claim 37, wherein each tooth includes a primary cutting angle and a secondary cutting angle.

39. The cutter of claim 38, wherein said primary cutting angle is between 3°-6°.

40. The cutter of claim 38, wherein said primary cutting angle is approximately 4°.

41. The cutter of claim 38, wherein said secondary cutting angle is between 10°-18°.

42. The cutter of claim 38, wherein said secondary cutting angle is between 12°-16°.

43. The cutter of claim 38, wherein said secondary cutting angle is approximately 14°.

44. The cutter of claim 33, wherein said substrate fiber channel comprises a substrate fiber channel located proximate a corresponding one of each said at least one row of teeth.

45. The cutter of claim 33, wherein said substrate fiber channel has predetermined dimensions to promote cutting of substrate fibers having desired features.

46. The cutter of claim 33, wherein the substrate is bone.

47. A substrate cutting device comprising:

a base comprising:

a cutter mounted thereon, said cutter being movable along a predetermined cutting path, and

a substrate chute extending through said base to position the substrate in contact with said cutter; and

a tower coupled to said base and comprising:

a lower surface containing a recess therethrough, said recess being in alignment with said substrate chute, and

a clamping mechanism for keeping the substrate in contact with said cutter.

48. The substrate cutting device of claim 47, further comprising a substrate fiber receptacle positioned beneath said cutter to receive substrate fibers cut from the substrate.

49. The substrate cutting device of claim 47, further comprising a plurality of grooves formed along a contact surface of said clamping mechanism for reducing movement of the substrate while in contact with said cutter.

50. The substrate cutting device of claim 47, further comprising a computer controller for controlling operation thereof.

51. The substrate cutting device of claim 47, further comprising a sensor arrangement for detecting prescribed conditions during operation of said substrate cutting device.

52. The substrate cutting device of claim 47, wherein said base further comprises a slide mechanism for receiving said cutter, and wherein said slide mechanism moves said cutter along said predetermined cutting path.

53. The substrate cutting device of claim 52, wherein said cutter is rotated a predetermined amount relative to the cutting path to engage the substrate.

54. The substrate cutting device of claim 52, further comprising a first actuation unit for moving said slide mechanism.

55. The substrate cutting device of claim 54, further comprising a computer controller for controlling operation of said first actuation unit.

56. The substrate cutting device of claim 55, wherein said computer controller variably controls the speed of said slide mechanism and a force applied to cut the substrate.

57. The substrate cutting device of claim 54, wherein said first actuation unit applies a force of 600lbs-900lbs during said predetermined cutting stroke.

58. The substrate cutting device of claim 54, wherein said first actuation unit applies a force of 700lbs-800lbs during said predetermined cutting stroke.

59. The substrate cutting device of claim 54, wherein said first actuation unit applies a force of 750lbs during said predetermined cutting stroke.

60. The substrate cutting device of claim 54, wherein said first actuation unit is pneumatically operated at a predetermined constant pressure.

61. The substrate cutting device of claim 54, wherein said first actuation unit is pneumatically operated at predetermined variable pressures.

62. The substrate cutting device of claim 54, wherein said first actuation unit is hydraulically operated.

63. The substrate cutting device of claim 54, wherein said first actuation unit is electrically operated.

64. The substrate cutting device of claim 47, wherein said cutter further comprises:

a leading edge and a trailing, said leading edge initially contacting the substrate during a cutting stroke, said trailing edge being raised a prescribed height above said leading edge;

a blade section disposed on a cutting surface of said cutter for cutting the substrate; and

at least one substrate fiber channel located proximate said blade section for directing substrate fibers away from the substrate.

65. The substrate cutting device of claim 64, wherein said blade section is elevated to a cutting height defining a thickness for said substrate fibers.

66. The substrate cutting device of claim 65, wherein said prescribed height is equal to the elevated height of said blade section.

67. The substrate cutting device of claim 64, wherein said blade section includes at least one row of teeth.

68. The substrate cutting device of claim 67, wherein each tooth includes at least one predetermined cutting angle.

69. The substrate cutting device of claim 67, wherein each tooth includes a primary cutting angle and a secondary cutting angle.

70. The substrate cutting device of claim 69, wherein said primary cutting angle is between 3°-6°.

71. The substrate cutting device of claim 69, wherein said primary cutting angle is approximately 4°.

72. The substrate cutting device of claim 69, wherein said secondary cutting angle is between 10°-18°.

73. The substrate cutting device of claim 69, wherein said secondary cutting angle is between 12°-16°.

74. The substrate cutting device of claim 69, wherein said secondary cutting angle is approximately 14°.

75. The substrate cutting device of claim 67, wherein said substrate fiber channel comprises a substrate fiber channel located proximate a corresponding one of each said at least one row of teeth.

76. The substrate cutting device of claim 64, wherein the trailing edge of said cutter is substantially flush with an upper surface of said slide mechanism.

77. The substrate cutting device of claim 64, wherein said blade section engages the substrate such that the substrate fibers are cut substantially along a grain direction of the substrate.

78. The substrate cutting device of claim 47, wherein said tower further comprises a second actuation unit for operating said clamping mechanism.

79. The substrate cutting device of claim 78, wherein said second actuation unit applies a force of 150lbs-250lbs onto the substrate.

80. The substrate cutting device of claim 78, wherein said second actuation unit applies a force of 200lbs onto the substrate.

81. The substrate cutting device of claim 78, wherein said second actuation unit is pneumatically operated at a predetermined constant pressure.

82. The substrate cutting device of claim 78, wherein said second actuation unit is pneumatically operated at predetermined variable pressures.

83. The substrate cutting device of claim 78, wherein said second actuation unit is hydraulically operated.

84. The substrate cutting device of claim 78, wherein said second actuation unit is electrically operated.

85. The substrate cutting device of claim 78, further comprising a computer controller for controlling operation of said second actuation unit.

86. The substrate cutting device of claim 85, wherein said computer controller variably controls a force applied by said clamping mechanism.

87. A method of cutting a substrate, comprising the steps:

placing the substrate into a substrate cutting device;

applying a predetermined force on the substrate;

moving a substrate cutter along a grain direction of the substrate;

cutting substrate fibers from the substrate;

detecting when the substrate has reached a predetermined minimum thickness; and

terminating the process if the substrate has reached the predetermined minimum thickness.

88. The method of claim 87, further comprising a step of initially determining if prescribed safety conditions have been met prior to beginning cutting of the substrate.

89. The method of claim 87, wherein the step of applying further comprises a step of varying the force applied on the substrate.

90. The method of claim 87, the step of moving further comprising a step of controlling the speed at which the substrate cutter is moved.

91. A substrate fiber produced using the cutter of claim 33.

92. A substrate fiber produced using the substrate cutting device of claim 47.

93. A substrate fiber produced by the method of claim 87.